Final Summary
Steller Sea Lion Recovery Team Meeting
Islands and Ocean Center, Homer, Alaska
15-19 August 2005

Bob Small, Chair of the Steller Sea Lion Recovery Team (SSLRT or RT), opened the meeting at 08:40 on August 15. This is the last scheduled RT meeting before a proposed September 1 deadline for submission of a draft plan. After staff introductions and a review of participant schedules, he introduced Brock Bernstein, facilitator for the meeting. Small noted that the Recovery Plan (RP) provides a basis for future recovery measures, and determines research priorities and monitoring efforts. He listed as goals for the meeting (a) determining the most important or contentious issues that still face the RT, (b) establishing a process for finalizing the RP, and (c) making necessary revisions to the RP. Capron thanked the RT for its efforts to date, noting that the National Marine Fisheries Service (NMFS) imposed the September 1 deadline because it needs the RP to guide North Pacific Fishery Management Council (NPFMC) processes. NMFS hopes to finalize the document through the fall, have a draft out to public and peer review by the end of the year, and distribute a final plan in spring 2006. The Alaska Fisheries Science Center will likely organize the peer review.

RT members were concerned what role, if any, the team would have after September 1. Capron noted that the RP is a NMFS document and states agency policy, but suggested that NMFS would be open to RT review of public/peer comments should the RT wish to remain involved. Some RT members expressed more interest in technical comments than those involving editorial style. Others were more concerned that NMFS has its own views that may differ from those of the RT, and questioned whether the RP was merely advisory or a document that would guide the agency. Capron stated that the agency would need to accept and support the RP and while no wholesale changes are planned, NMFS would need to be certain that the RP speaks with a single voice on the variety of options. NMFS must document in the record any changes it makes to specific RT recommendations.

Small reviewed the terms of reference for the RT, noting that RT members sit as independent experts, not agency representatives. They are to prepare a plan focused on the recovery of Steller sea lions (SSL), which examines all problems facing the two stocks over their range and prioritizes measures taken to remove SSL from listing under the Endangered Species Act (ESA). Capron noted that the RT's legal requirements are to describe the site-specific management actions needed; provide objective, measurable criteria for downlisting/delisting; and give estimates of the time and cost needed to reach these intermediate and final steps. The RT then reviewed the agenda for the week.

Review of Draft RP Language

The RT reviewed the RP table of contents, describing each section and discussing any major issues that remain. Small noted that originally a subgroup of about 10 RT members was to make the changes needed to the entire plan, submit those to the entire team for review, and explain the rationale at this meeting. Although there was much accomplished, much of this work remains

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unfinished. The RT must now identify final revision needs and decide how those changes will be made.

Chapter III – Biology and Life History

This section was intended as a concise summary of important aspects of SSL life history, not an exhaustive thesis. Trites and Pitcher updated this section with the most current information and tried to remove areas of speculation. Some RT members noted inconsistencies between population abundance statistics cited in this and other sections. Uncertainty over the period covered by this document (i.e., data through 1999 or through 2004) was cited as a possible cause for inconsistency. Other RT members expressed concern that count methodology had changed over time, or that the merits of these methods (especially count expansions) had not been discussed. Some suggested that the sections seemed unbalanced, citing the length of the feeding ecology section; others replied that the length reflected the abundance of work done in that area. RT members suggested that the level of detail in each section should be consistent. Several RT members suggested that additional tables or figures might be helpful to the general reader.

Chapter IV – Conservation Measures

This section on measures already taken to conserve SSL has been revised several times. The section tries to describe decisions made to address major threats, provide a rationale for those decisions, and assess whether they were successful. Achieving an acceptable level of detail has proved frustrating and the description of fishery catch in Critical Habitat remains at issue. Some RT members expressed dissatisfaction with the current draft, citing a need to include more information from the 2003 NMFS Biological Opinion (BiOp) and a table describing how much of the biomass in Critical Habitat has been protected. Others suggested that simple accountings of the catch in Critical Habitat do not recognize the importance of catch within 10 miles of rookeries and haulouts; they described the figures and tables used in the current draft as incomplete and/or inaccurate. Some felt these tables could not capture the complexity of North Pacific fishery management over space and time, while others found the tables helpful in providing a general flavor of the types of measures taken. Suggested revisions ranged from more extensive references to the BiOp, to more extensive use of maps to illustrate geographic trends in closures of Critical Habitat, to limiting the chapter to brief descriptive text and covering additional detail in an appendix. Some RT members were reluctant to edit the text further in light of prior extensive revisions. RT members generally favored using the table and capturing any caveats in text (6 votes), over using maps (3 votes) or using only text (2 votes). Capron suggested that RT members were conflicted by their need to describe the measures taken and their desire to debate the underlying science. He voiced concern that RT members had varying expectations for details in any revision.

Chapter V – Recovery Plan for the Western DPS

Section A- Population Status: Fritz updated this section to reflect 2004-05 census data and added a map of major rookeries and counts. Little has been done to update for Russian data collected since 1999.

Section B – Factors Potentially Influencing the Population: This section is intended as a concise summary of each factor that could potentially affect SSL with a brief description of the mechanisms involved. The RT tried to avoid assessments at this stage. Subsection B.10 –

Cumulative Effects describes how several of these factors could work together. Subsection B.11 – Ecosystem Effects describes factors that could impact the ecosystem beyond SSL alone. Subsection B.12 – Threats Assessment provides a relative ranking of threats and not a quantitative assessment. Williams most recently revised Subsections B.1-9, removing subjective information and attempting to balance the length of sections. Small noted that Subsection 2 – Predation still needs additional killer whale-specific information and will work with killer whale researchers to better capture the impacts of predation modeling exercises. Williams revised Subsection B.8 – Reduced Prey Biomass & Quality extensively to make it consistent with the threats table and added several appendices. She asked for input on the level of detail and the direction of the section. Lloyd and Fritz reviewed earlier RT comments on Subsections B.10-12, eliminating redundancies and unnecessary references, but found that the revised version contained more questions and comments than text. They asked whether the RT wished to keep this material, and Lloyd suggested that the threats table, in particular, needed extensive RT review.

Section C – Recovery Plan: Subsection C.1 – Recovery Strategy describes the general approach to the recovery, and is a new subsection recently prepared by Small. Subsection C.2 – Goals and Objectives are required by the ESA and provide specific criteria that must be seen in order to downlist a species. The current draft contains general criteria drafted by the Population Viability Analysis (PVA) team that could be used in lieu of a PVA analysis. Subsection C.3 – Recovery Actions provides specific details about actions needed to address the recovery criteria. Byrd reorganized this subsection from prior drafts. Subsection C.4 – Implementation Schedule was drafted by Capron and is a synthesis of the overall package that describes how long it will take and estimates cost.

Chapter VI – Recovery Plan for the Eastern DPS
The RT has not revised this chapter extensively from earlier drafts. Gelatt added more recent information on predation and entanglement, and there were no major deletions. Some RT members wanted to see the results of a PVA analysis for the Eastern DPS before completing this portion of the recovery plan. Although some RT members suggested that cumulative factors could be causing this population to grow at less than the theoretical maximum rate, no such factors and no significant threats were identified. Capron asked the RT for guidance on research and monitoring activities needed in a post-delisting monitoring plan.

Identification of Issues

Bernstein and RT members reviewed the team's voting procedures (75% of team present at the start of a meeting needed to establish a quorum; 66% of those present needed to pass a motion). Bernstein suggested that consensus is unlikely at this stage, and stated his intent to pose alternatives and take straw polls to assess group sentiment. If disagreements cannot be bridged, the RT needs to describe the nature of those disagreements as clearly as possible. Capron urged the RT to avoid minority reports. Small suggested that uncertainty in the available information increases the likelihood that RT members will disagree, and that a RP reflecting those differences is superior to one watered down to something to which all could agree.

Bernstein asked each RT member to identify the most important outstanding issues before the team. Recovery criteria were most frequently mentioned, followed by a review of the threats table. Other issues mentioned included: improving the scientific credibility of the report by addressing inconsistencies and removing subjective statements; research/data needed to reduce future uncertainty; definitions of Critical Habitat; catch in Critical Habitat; impacts of predation; relative importance of prey species; measurements of prey density; assessing ecosystem impacts; and updating the report to reflect the most recent data.

Explanation of Draft Recovery Strategy and Recovery Criteria

Members of the PVA team discussed the rationale behind their proposed draft, which was prepared prior to a report on Goodman's PVA analysis. The Recovery Strategy section provides a general overview of the status of SSL, and then focuses on the key needs to (a) better understand the threats, and (b) develop an adaptive management approach. The PVA team then provided four biological recovery criteria for downlisting that specified a general population increase over two generations, with observations of specific SSL population and metapopulation dynamics statistics supporting that trend in all U.S. and Asian regions. The PVA team included a non-PVA based quantitative criterion to initiate discussion because the initial PVA analysis was not yet completed when the draft text was prepared, and also to explore an alternative criterion outside a PVA approach. They noted that the ESA requires elimination of extinction risk over time, not the restoration of optimal or maximum numbers of animals. They emphasized that a downlisting from Endangered to Threatened status after two generations would not remove all protections, but would simply acknowledge that the threat of extinction was not eminent. Several RT members questioned why the listing status would depend on a population component that is outside the jurisdiction of the U.S. (i.e., Asian SSL), but Capron replied that NMFS believes it would not be in compliance with the ESA if it simply ignored the Asian component. Others questioned why the proposed Western DPS downlisting criteria are so similar to the Eastern DPS delisting criteria; PVA team members indicated that the threats facing the Eastern DPS are better understood and likely different for the two DPSs, and described the criteria as proposals for discussion purposes.

Capron suggested that the RT agree on the types of information NMFS would need to see in order to downlist SSL rather than focusing on specific numbers. He characterized the RP as a guide to let the public know generally what the agency expects. The agency might see those conditions earlier than anticipated and decide to downlist immediately after its status review.

Review of Factors Influencing the Western DPS

Before considering the threats table directly, the RT agreed to review draft sections describing those threats. They began with the most contentious sections that could have the greatest impact on the threats assessment.

Subsection V.B.2 – Predation
Small discussed his recent revisions and data sources. RT members noted that the summaries of the Barrett-Lennard et al. (1995) and the Williams et al. (2004) simulations were not of comparable detail, and Williams agreed to provide a more detailed summary. Others noted that

the text did not reflect that the presence of only a few specialized predators could have a significant impact; Small will add additional information on specialization in AT1 transient killer whale diets. Some RT members suggested that the text reflect the existence of differing views on the extent to which killer whales caused the decline of SSL, but RT members agreed that topic was best left to the threats assessment section. Structurally, RT members suggested that the listing of data gaps associated with killer whales be moved from the end of the predation section to the end of the killer whale discussion.

Subsection V.B.7 – Climate Change
RT members agreed that this section should address the broader aspects of climate change (i.e., global warming) rather than regime shifts. Several noted that even if this threat exists, the RT can propose no recovery actions to address it. The RT agreed to consider this a speculative threat that could become an issue in the future. The threat could be discussed generally, with reference to potential changes in the physical environment (e.g., rising sea levels could cover some beaches but others may be created).

Subsection V.B.5 – Parasitism and Disease and Subsection V.B.6 – Toxic Substances
Some RT members noted that this section contains considerable information about diseases in other species, but the relevance to SSL is not clear. The existence of these threats is a theoretical possibility, but there is little direct evidence they actually occur in SSL. RT members observed that simple exposure to these threats does not make an animal unhealthy and may not affect population growth. Some questioned why disease and toxins are ranked as low threats and nutritional stress is ranked high, when they all affect fecundity and juvenile survival and there is minimal objective evidence for any of them. There were also suggestions to update the section with more recent data, and to move the last paragraph in the toxic substances section to the beginning. Small and Bernstein suggested that Atkinson be assigned to revise both sections to focus more on SSL with more definitive statements. They suggested that the NRC report may provide a model for a more generalized treatment. Small also observed that the threats table for the Western DPS refers to biotoxins, but this draft makes no mention of the threat; RT members agreed that while there is some evidence for biotoxin impacts on the West Coast (e.g., domoic acid in California sea lions) there is no evidence for similar impacts on the Western DPS.

Subsection V.B.8 – Reduced Prey Biomass and Quality
Williams gave an overview of her recent revisions to this section. Recovery will be precluded without adequate amounts of food, and inadequate food should be manifested though signs of nutritional stress. More detailed treatment of prey fields and nutritional stress were provided in appendices. RT members did not object to the general approach as long as the appendices were included. Since there are no signs of acute nutritional stress and only some suggestions of chronic nutritional stress in SSL, some objected to the extensive treatment of commercial fishing as a source of nutritional stress when it is only one of several potential sources.

The RT reviewed this entire Subsection at the paragraph level; Appendix A is a summary of RT comments. In general, the RT agreed that the nutritional stress section should begin with an introductory paragraph that amplifies the subtlety of nutritional stress signals and the difficulty of detecting them in the field. The following paragraphs should amplify actual field data on a temporal scale, emphasizing the source and spatial heterogeneity in the signals. It should mimic

other sections that describe threats generally and leave most details to the appendices. Williams asked whether RT members agreed that there is no evidence for the existence of acute stress in SSL and only equivocal evidence for the existence of chronic stress. Some had no confidence in researchers' ability to detect nutritional stress in the field, while others admitted that the only evidence for the existence of chronic stress is continued low population numbers. No member could confidently state that chronic stress does not exist. Some suggested that adult females are the most likely to exhibit chronic stress in the Central Gulf of Alaska, and noted that no samples have been collected from this cohort in the last 10 years. Others suggested that the mechanism by which nutritional stress could affect demography is not known.

The RT was divided in its evaluation of Table 1 (p. 26[63])[1]. Some liked the format and argued that the RT should be able to prepare a similar table for all major threats. Some suggested that removing subjective statements from the table would be too time consuming and the original table from Goodman et al. (2002) should be used instead. Others maintained that every issue discussed in the table had already been included in text, except that the table suggested a worse case scenario for all outcomes. They suggested that for consistency, the RT would need to use a similar approach for all threats. Some suggested that the conclusions of Table 1 are based on a series of embedded assumptions. The RT eventually agreed to delete Table 1.

Similarly, the RT was divided in its evaluation of Appendix 1. Some recommended deleting Appendix 1 as redundant and unnecessary, since the NPFMC is having difficulty defining Ecosystem Management much less determining the relative status of its current management. Others maintained that it is the intent of the ESA to focus on the ecosystem; NMFS is charged with evaluating ecosystem impacts and recognizes the need to move toward ecosystem management. RT members disagreed over the propriety of including the direct quotation from Goodman et al. (2002) (p. 27[64]); the clarity of Figure Z (p. 30[67]) as a graphic illustration of historic biomass and fishing patterns; and the accuracy of conclusions drawn regarding localized depletion in Fritz et al. (1995) (p. 28[65]). Bernstein suggested that Fritz redraft the appendix to suggest a possible mechanism for ecosystem impacts, list the relevant studies and note that none of these have produced solid results, and conclude by identifying data gaps. Regarding Figure Z, RT members suggested (a) update the graphic to reflect more current data, (b) discuss model artifacts associated with start-up years in Figure Z or truncate those affected data points, and (c) provide equivalent data for the Gulf of Alaska. RT members also suggested presenting Figures X1 and X2 as stacked bar charts to differentiate the proportion of catch taken 0-10 miles from shore from that taken in other areas of Critical Habitat.

The RT discussed the utility of the Table 1 currently located in Appendix 2 (p. 32[75]). Some found the table difficult to interpret, and others believed its potential value was diminished by (a) a lack of footnotes to cite specific studies (or the location of unanalyzed data), and (b) its complicated basis for comparisons. Others charged that some of the Y and N designations were unsupported, suggested that changing techniques over time could account for some perceived data gaps, or acknowledged that the table does not convey the temporal or geographic complexity of available data. Despite these limitations, some believed that the table provided an instructive illustration of the number of factors involved, and suggested the table be revised and included with caveats in the data gaps section.

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[1] See Appendix A for an explanation of the page numbering convention.

Subsection V.B.12 – Threat Assessment
Bernstein asked RT members to describe the issues remaining in the threat assessment. The ranking of threats remained problematic for most team members. The reasons they cited included misunderstandings over what was being ranked, confusion regarding the basis of comparison, changing views on the relative importance of particular threats, and concern that the rankings did not represent consensus because many RT members did not vote. Members were uncertain whether the impacts of commercial fishing, for example, were ranked before or after the implementation of current mitigation measures. Several members were concerned that PBR standards from the Marine Mammal Protection Act (MMPA) were incorporated with no discussion of what constitutes recovery or whether the loss of that number of animals would significantly impede progress toward recovery. Others expressed confusion over terminology (e.g., geographic range of occurrence vs. geographic range of impact; natural vs. non-natural or added mortality), while others noted that some of the categories were themselves the subject of contentious debate. Some suggested that the table was simplistic, since SSL in different regions or clusters appear to be affected by different issues across the range of the Western DPS. Despite these limitations, some members recognized a need to summarize RT views on current threats and recommended that the table be retained with revisions.

Discussion of PVA Analysis
RT members requested a discussion of the PVA analysis before proceeding with the threat assessment. They suggested it would be difficult to assess the severity of threats to recovery without knowing the overall goals for that recovery.

Goodman reported that the information available to drive a PVA model for the U.S. portion of the Western DPS is meager. There is substantial information for only a relatively few areas and times. The most consistent information is population size, using regular surveys in recent years and less systematic estimates from earlier times. From these data it is possible to obtain six estimates of population size at roughly decadal intervals. These estimates are consistent given what we now know about regime shifts in the North Pacific; i.e., those ocean states that occur at intervals of about 10 years. The impact of these regimes is now clear with regard to salmon productivity, but their influence on marine mammals is less certain. It is reasonable to model SSL dynamics similarly, and it requires a model that randomly selects environmental conditions every ten years.

The model can draw on history to estimate the range of possibilities, but this has two shortcomings: First, the available history is only a small sample (i.e., five sample intervals) from a distribution, so chance statistical sampling effects must be taken into account. Using the mean and standard deviation of historical data, the model will resample from that distribution and propagate its uncertainty through forward projection. Tree ring patterns have also been correlated with an environmental pattern known as Pacific Decadal Oscillation (PDO), and this provides an additional source of information extending back over 500 years. The pattern appears similar to an auto-correlated Gaussian distribution which can be reproduced using current statistical methods. Along with historical parameters, this distribution can be used as the basis for a SSL model. Second, it is unlikely that the previous five decades are representative of the long term history or future of SSL. The declines during this period were abnormally steep and it

is likely that anthropogenic effects were involved. In order to project into the future, the model must correct for those effects that humanity is committed not to repeat (e.g., shooting, disturbance on rookeries or in Critical Habitat, bycatch, possible competition for prey, etc.). After correcting for these influences during each interval, the new distribution can be used to project forward.

Goodman acknowledged that the model does not make distinctions by region and is not intended as a metapopulation model. On a decadal scale, some of the SSL population changes were truly area-wide. The model presumes that there is enough movement within the metapopulation that areas will not become extinct overnight. RT members would need to continue area-wide monitoring efforts to ensure that the model depicts reality.

The model could be used to project down to the last two animals, but population studies suggest that is not appropriate for genetic and other reasons. Usually a higher quasi-extinction level is chosen and models project the likelihood of reaching that level rather than literal extinction. The PVA subgroup decided that the genetic standard was most encompassing, and on that basis suggested a quasi-extinction level for the SSL Western DPS of about 4,700 animals of all ages. When asked to relate this concept to other species with relatively small populations (e.g., grizzly bears, Laysan duck), Goodman acknowledged that sometimes judgments on home range size or carrying capacity make higher numbers unrealistic even if desirable. The probability of extinction for these species will be higher, and a greater degree of protection and intervention will be required to avoid extinction.

There are some hypotheses that are not included in the model at this time. It may be possible that the wide SSL population swings of the last 50 years are normal and that the species has some density dependent resistance to being driven down to zero. Evidence to support that hypothesis could be drawn from pup survival on rookeries, and from the persistence of rookeries during the decline. It may also be possible to develop hypotheses involving other freak or one-time events to explain historic patterns (e.g., competition from increasing humpback whale populations). Killer whale predation could be considered either natural background or a freak event. The RT could develop a narrative to explain any reasonable alternative hypothesis, place a modest probability on its occurrence and include it in the model, but the RT then commits itself to a monitoring program to ensure that future events do not move in unexpected directions.

During an extended discussion period, the RT suggested some correction factors that could be used in an initial PVA exercise (Table 2). Some of the estimates were drawn from reports available to the RT at that time, while others were estimates based on members' personal experience. Two fishing impact scenarios were suggested, based on personal views of the effectiveness of fishery closures during the 1990s and in 2000.

Goodman used these correction factors in a model run and reported that they would account for surprisingly little (only one or two percentage points) of the annual decline. To the extent that the declines are not attributed to factors that will not recur, they become part of the background model and suggest that severe population declines are a recurring problem for SSL. Goodman suggested that the RT discuss which of these estimates are likely too low, despite objections from some members that this meant engaging in idle speculation about the causes of the historic

decline. While some RT members suggested that historic shooting estimates might be low, others suggested that the existing numbers might already be exaggerated. Even if some of the estimates are low, however, none could account for the 16.8% annual decline recorded during 1985-89. Some noted that observed SSL survival rate patterns are most sensitive to declines in juvenile survival, and it is unlikely that shooters were selectively targeting juvenile animals. Some believed that predation by killer whales could account for significant declines under the proper circumstances (e.g., prey specialization, sequential prey switching), but none could predict the likelihood of recurrence.

Some RT members questioned why the PVA must be used as a test. They were uncomfortable using a 50-year period of decline to predict the future and argued that an observed increase in population numbers over time, regardless of the reason, should be adequate. Goodman replied that the RT must agree on a standard that provides a reasonably high probability the SSL population will persist for a specified number of years, and to propose criteria describing some measurable parameter(s) that will indicate recovery if observed in the future. A trajectory is adequate only if it persists, and PVA provides a systematic way to evaluate that trend. A PVA exercise gives the RT confidence that the status proposed in its criteria really meets the persistence standard. Although mathematical adjustments for the length of the period of decline might provide some increased probability of persistence, Goodman acknowledged that complete delisting of SSL is unachievable in the foreseeable future based on this simple PVA approach. He considered downlisting from Endangered to Threatened status with sufficient safeguards a more realistic achievement.

Discussion of Recovery Criteria for the Western DPS
Small reviewed the draft criteria, indicating that a quantitative criterion could be derived from the PVA, but that the PVA team included a non-PVA based criterion (an increasing U.S. SSL population for two generations) to initiate discussion because the PVA results were not available when the draft text was prepared. The remaining three criteria (population ecology and vital rates indicative of the trend, metapopulation dynamics indicative of an increasing population in all areas, stable or increasing Asian population) provide added assurance that the modeled trend is real. RT members commented as follows:

- The meaning of the term "indicative" is imprecise and some sought a more definable standard.

- Some objected to the specific reference to vital rates, suggesting that those statistics can be collected only with difficulty and do not provide a practical monitoring tool. Currently available vital rates data have been collected at only a limited number of sites. They preferred some guidance or confidence level in Criterion #1 that the trend will continue.

- The definition of "generation" was questioned by some (e.g., decade, average female age at first reproduction, etc.). Fritz estimated the average age of a breeding SSL female at slightly over nine years, and Goodman noted that for model purposes decades and this measure of SSL generations are functionally equivalent. Some argued that two generations did not represent an adequate time in light of historic SSL declines, while

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others considered two generations too long for downlisting since it suggested to them a delay of at least 20 years before adaptive management regimes could be considered.

- Some considered the requirement for stable or increasing trends in all sub-regions of the Western DPS an excessively high standard. They reasoned that few Threatened or Endangered species occupy all of their historic range, and that some of the sub-regions (e.g., Eastern Aleutians) are comprised of relatively few sites. If other sites are stable or increasing, they thought it unlikely that even the complete loss of a sub-region would place the entire population at risk of extinction. They favored a standard by which only a proportion of sub-regions must be stable or increasing. Others, however, urged the RT to preserve intact a species that currently occupies most or all of its historic range. They maintained that the Pribilof segment of the stock is already gone, another may be in jeopardy (i.e., the California portion of the Eastern DPS), and other segments are at low levels.

- Some objected to the requirement that the Asian component of the wDPS also be stable or increasing. They considered the U.S. Western DPS the core of the SSL range, and could not accept linking progress in Alaska to an area outside U.S jurisdiction. They suggested combining Criteria #3 and #4 so that five of seven areas show stable or increasing trends, with no two adjacent areas declining.

Generally, several RT members were concerned that the draft criteria are so precautionary at every step that they create a checklist that is too rigorous. They believe the cumulative effects preclude downlisting and experimentation for at least 20 years, and make delisting impossible. Capron stressed that the RP is a guidance document to give the public an idea of what to expect. While Threatened status implies a decreased perceived risk of extinction and gives the agency increased latitude to allow takes, it is no guarantee that adaptive management would be allowed. As a practical matter, implementation of an adaptive management regime would mean a change in fishing practices that would be subject to a MMPA review. Goodman cautioned that while adaptive management is a term that is well defined in an academic sense, it is undefined in practice and has been used as an excuse for a variety of activities. He recommended clear definitions if the term is used by the RT.

Discussion of Western DPS Listing Factors
Capron described the listing factors as benchmarks for knowledge, activities, or actions to ensure that all threats are addressed. The factor categories are specified in the ESA. If it is important that an activity take place, including it among the listing factors is one way of ensuring that it happens. In recent ESA revues, listing factors receive consideration equivalent to that afforded biological criteria and the agency must address each factor in the record before reclassifying a species.

Many comments of the RT reflected concern over language that, if taken literally, could result in an unreasonable set of requirements (Appendix B). They tried to imagine how these standards could be enforced or monitored in the future, and were concerned how the agency would justify its actions in court. Since the factors are not quantitative, it is a matter of opinion whether the actions they specify have been met. Some recognized that these factors flowed from the stepdown outline, but were concerned that in this context they make no distinction between actions that need to be done and those that would be nice to do. Capron suggested that the

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factors are not rigid requirements. The agency will weigh available information during its status review and always has the latitude to modify requirements. While the intent is that the agency will accomplish all of these tasks, the final decision on any reclassification is still up to the Secretary of Commerce. Other comments related to apparent redundancies between factors; Capron noted that since the factor categories are specified by law, some of these redundancies (especially involving Factor D) are unavoidable.

Discussion of the Recovery Strategy, Recovery Criteria, and Listing Factors for the Eastern DPS

Capron noted that the Eastern DPS retained its Threatened status when the two DPS units were established in 1997 due to concerns about the loss of rookeries at the southern end of the range, the potential for mixing or other interactions between the Eastern DPS and Western DPS, and the potential for fisheries interactions. The draft Recovery Strategy references those issues and discusses why they are no longer of concern. RT comments identified several technical corrections. They recommended that the reference to "increased incidence of disease" (¶ 3, p. 17[199]) be removed, since it refers to a hookworm infestation that may not actually be increasing. Researchers lack the historical samples needed to provide that frame of reference. RT members also recommended removing the reference to "near carrying capacity" due to potentially negative connotations and indicating instead that the population does not appear to be limited. Some RT members noted that the description in the draft strategy focused exclusively on conditions in Southeast Alaska and British Columbia; they suggested that more descriptive information be included on stock status in more southerly portions of the range.

Small noted that the Recovery Criteria for the Eastern DPS specifies only an increasing population for two generations. Although a PVA for the Eastern DPS was once planned, everything currently known about the population and the threats it faces suggests that it is recovered. Observations of population parameters to date give confidence that the trend will continue. Some RT members favored Recovery Criteria similar to those used for the Western DPS and questioned why there was no requirement for stable or positive trends in all regions. They suggested that there is no assurance the unknown factor that affected the Western DPS during 1985-89 could not surface in the east. RT members were uncertain whether maintenance of the southern rookeries preserves genetic diversity. Haplotypes found in Oregon SSL are not unique in the Eastern DPS, but there are no known genetic samples from California rookeries. Most RT members agreed, however, that the southern portion of the Eastern DPS was at the geographic limit of the range, suggesting that what happens there does not affect the core. Capron noted that the apparent shift of the range to the north in the Eastern DPS should be discussed in the threat assessment. He reminded the RT that the agency must prepare a post-delisting monitoring plan should the delisting take place. Other RT members observed that the protections of the MMPA would remain for SSL in southern regions even if ESA Threatened status is removed.

In its review of Eastern DPS Listing Factors, the RT recommended removing the specific reference to Lynn Canal in Southeast Alaska from Factor A.1 (p. 20 [202]). They reasoned that development pressures in other areas were of no less importance. An RT suggestion for installation of video monitoring devices at all rookeries in the southern portion of the range was noted for possible inclusion in a post-delisting monitoring plan. Several RT members observed

that the there are no specific actions listed under Factors B-D, and wondered why actions similar to those in the Western DPS Listing Factors were not specified. Capron replied that only those tasks needed for delisting should be included, and tasks should not be added arbitrarily just to be more stringent. He welcomed RT suggestions for items to include in a post-delisting monitoring plan.

Discussion of Future RT Direction

Prior to the departure of four RT members on Wednesday evening, August 17, the RT discussed how it wished to proceed with the current draft RP given the September 1 deadline imposed by NMFS. Several members complained that important segments of the document (e.g., PVA analysis, recovery criteria, recovery factors) were not received by the team until shortly before (or upon) arrival at the meeting. Several voiced dissatisfaction with the current draft and a reluctance to associate their names with it. Among the options they discussed were allowing the remaining RT members to work until Friday and submit whatever they completed, or to assign a subgroup to significant writing assignments that would be reviewed by the RT before submission to NMFS. A majority of members (12) favored having the document polished by an editorial staff, making additional writing assignments to RT members, and holding another meeting of the RT to work through the remaining issues. If this alternative proves unacceptable, they believe the agency must accept the document as is without RT endorsement.

The next day the remaining RT members discussed the implications of this vote. Capron stated that there is no money for additional meetings and assessed the chances of an additional meeting as low. The agency needs a draft plan by the end of the year, and he doubted the RT's commitment to devote the time and energy needed to complete the RP. Some RT members suggested that the outstanding writing assignments were trivial editorial matters, and that the real issues for resolution involve the PVA, recovery criteria, and threats assessment. They suggested that another meeting might produce a better document for NMFS, and noted that the onus would then be on the RT to perform. However, others suggested that given the scientific uncertainties and polarized views on the RT, no amount of additional time will produce a plan more useful to the agency. Some suggested that a statement by this RT on how or whether to deal with uncertainty could be its most important contribution to the next RT.

Additional Discussion of Extinction Standards and the Quasi-Extinction Level

Small noted that the subgroup had reviewed available literature before selecting the standard of less than 1% probability of extinction in 100 years. He acknowledged that while there has been considerable scientific effort to study that standard, the selection of those values is a policy decision. Goodman noted that the extinction standard should not be case specific, since society should be no more willing to let one species go extinct than another. He noted that both the US Fish & Wildlife Service (USFWS) and NMFS have held national workshops to examine the standard, and the NMFS workshop concluded that the 1% in 100 year standard is appropriate. A joint USFWS-NMFS committee has not yet reached a decision on a uniform national standard. Some argue that the rate of 1% in 100 years is too high given natural rates of extinction. They project that if an extinction standard of 15% in 100 years had been adopted 5,000 years ago, the probability that none of the more than 4,000 species then present on earth would still remain is

27%. Goodman suggested that the agency consensus seems to be crystallizing around the 1% standard, and Capron agreed that departure from a 1% standard will require some explanation. They acknowledged that some salmon plans are considering a 5% in 100 year standard, but Goodman suggested these plans must eventually be reconciled with a national standard.   Most RT members were willing to accept the 1% in 100 years extinction standard without additional debate if it is seen as a national standard that is beyond the purview of the RT and represents the recommendation of experts.

Small and Goodman described the process used by the subgroup to determine the quasi-extinction level. From the standpoint of genetics, inbreeding occurs at low population sizes and there is scientific evidence that inbreeding reduces fitness. At some point, however, the effects of mutation balance the effects of inbreeding. The available literature suggests different population abundance ranges at which this may occur, from 500 to 1,000 or 1,000 to 5,000, and the PVA team selected the midpoint; i.e., a population of 1,000 randomly breeding individuals with a 50:50 sex ratio. To translate this effective population to its equivalent SSL population, the subgroup relied on all medium-format photographs taken of Western DPS rookeries during 1998-2004. These photographs indicate that only 80% of the animals on a rookery are actually breeders, and the ratio of breeding females to breeding males is 5:1. The number of breeding males is a limiting factor. After expanding for these factors, and for the proportion of the population counted by aerial surveys, the equivalent SSL population is approximately 4,700 animals including pups. This population size is sufficiently large to address other issues (e.g., predator pits), but does not take into account the presence of smaller effective breeding units (e.g., rookeries). Goodman suggested that a 4,700 DPS-wide SSL population is not particularly precautionary from this latter standpoint.

Additional Discussion of PVA

After working with the PVA model and table of correction factors, Goodman reported that the correction factors reduced the -16% annual decline during 1985-89 to -12%, but the Western DPS would never achieve recovery if that level of precipitous decline remains a possibility. He discussed how the RT could provide a rationale supporting a hypothesis that the declines of 1985-89 and the fisheries influences of 1-3.5% during that period represent freak occurrences that will not be repeated, and on that basis could be dropped from the analysis. With those data excluded, downlisting goals could be met (i.e., less than a 1% chance of extinction in 100 years) with two more generations (or decades) of growth at the current rate of 2-3%. Since the model continually incorporates the most recent data, the downlisting goals might be achieved in less than two generations if the actual observed growth rate proves to be faster. Building on these facts, the RT could propose as downlisting criteria two more generations of growth at the current rate or higher, provided nothing occurs to lessen confidence in the underlying hypothesis and there is sufficient monitoring to detect and problems in the population. If problems are detected, the population returns to its Endangered status or additional protections are implemented. Goodman clarified that two decades of growth imply average decades (i.e., the average of 5 data points at the current survey frequency); downward blips are not significant as long as the overall trend is upward.

Incorporating the hypothesis of a density dependent mechanism reduces the probability of extinction but not significantly. There is no empirical evidence for such a mechanism other that the fact that the species persists, so Goodman was unwilling to assign the hypothesis a weight greater than 5%.

RT members were generally skeptical about completely dropping the data from 1985-89. They questioned what could be so extraordinary about fishing during those years. Goodman suggested that possibly the way in which the Joint Venture fisheries of the time were prosecuted gave fishermen an abundance of free time for shooting, or that the prosecution of concentrated winter fisheries represented a choke point for SSL. Some questioned whether the original rate of decline had been calculated correctly, but those with knowledge of the counts suggested it was of the proper order of magnitude. Similarly, there are no obvious indications that the counts themselves could have been faulty (e.g., female SSL were alive but not in attendance on rookeries). Others doubted that the entire impact could be attributed to shooting, since the fishery (and therefore any shooting) was concentrated at a few fishing locations, yet SSL declines were seen over the entire range. Some suggested that shootings associated with strong salmon fisheries of the period have been underestimated, but others noted that there are no salmon fisheries in the area of decline west of Unalaska. Evidence of declines in other marine mammal species during the same period (e.g., monk seals) was cited as additional support for a strong natural component. Other unusual events that occurred during the period included the Exxon Valdez oil spill, and a period of intensive roe stripping during which SSL followed fishing boats to feed on carcasses.

Most RT members were unwilling to completely exclude 1985-89 data but were willing to assign it a low probability of reoccurrence under the hypothesis that a "perfect storm" convergence of factors was responsible. Some suggested that the RP show several model runs (e.g., including 1985-89, low probability, excluding) to provide a range of options. They stressed the importance of clearly explaining why the RT chose the low probability option. Others suggested that the RP discuss the differences between Goodman PVA and that developed for the RT by Winship, and explain the reasons why the RT chose the Goodman model.

The RT discussed whether to base recovery criteria on the adjusted PVA, the unadjusted PVA, or on the more generic criteria used in the draft RP. Goodman emphasized that if recovery criteria are based on a hypothesis of unknown validity (i.e., that 1985-89 is an anomalous period), the RT must include a contingency plan in case the hypothesis is wrong. The contingency plan would describe how to detect an erroneous hypothesis and what to do if that happens. Most (10) of the remaining members were willing to accept the adjusted PVA with sideboards as described by Goodman, but one member opposed all use of the PVA. Those who favored use of the PVA cited the structure it provides to consider a variety of factors coherently, although several voiced reservations over the historic database (e.g., historic population numbers may have been abnormally high), the adjustments proposed earlier in the meeting, or the use of a model that is incomprehensible to the average reader. The member who opposed the PVA was distrustful of the model and was especially critical of the adjustments, describing them as largely conjecture with no verification.

Several members who had reservations regarding PVA had difficulty reconciling its multiple layers of precautionary measures with the "eminent risk of extinction" standard in the ESA. They suggested that downlisting should be considered after some shorter period of stability or slow growth. After 20 years of growth at 2-3% per year the Western DPS will number about 84,000 animals, about twice its current size; some suggested that would be a large population for an endangered species. Goodman suggested that a period of slow growth would not provide a population large enough to buffer against declines similar to those observed historically, and noted that it is unusual for a population of large, long-lived mammals that have few young to decline 80% in 50 years. There are many species for which volatile population dynamics are the norm (e.g., insects, fish, most invertebrates, rabbits, etc.), but species that experience huge declines usually have many young and are capable of rapid recoveries. Critics countered that if SSL carrying capacity has become established at its current level, the RT may be condemning society to wait 50 years for something that will never occur. Goodman knew of no data to suggest a lowered carrying capacity and acknowledged that the model will take a long time to "forget" history; he suggested that the search for unknown density dependent factors could motivate research and experimentation. Capron emphasized the need to be precautionary because the RT does not know why things happened in the past. He suggested that the recovery criteria are statements of what the RT expects to happen in the future, not what it would like to happen. Under current conditions, he believes it reasonable to tell the public to expect at least 20 more years of comparable fisheries regulation. Experimentation could still occur on a population classified as Endangered as long as the underlying rationale does not have the expectation of negative impacts. Experiments must be monitored and work must halt if mortality is observed. Fisheries experiments would occur through changes to existing regulations and these would be subject to the usual NPFMC process.

Additional Discussion of Threats Table and Threat Assessment

The remaining RT members revisited the threats table (p. 54 [91]) and discussed whether it should be included in the RP. Some favored dropping the table in favor of a narrative description of threats. They noted that many members believed that the wrong questions were asked, or that members did not understand how they should assess threats. The columns associated with frequency of occurrence, geographic range (occurrence and impact), and relative impact were cited as most problematic. Several suggested that the introduction of PBR standards was not helpful, but others noted that some estimate of expected magnitude (even an arbitrary one) is necessary to rank threats. Those who favored the table noted that previous RT efforts to produce a relative ranking or to associate ranges of potential mortality to threats were unsuccessful, and questioned how recovery measures could be evaluated with no assessment of threats. They also believed that the columns dealing with uncertainty and feasibility of mitigation provide useful background on the uncertainty associated with PVA variables.

RT members agreed that most of the threats are not likely sources of high mortality and those rankings are not controversial. The rankings associated with fishing, killer whale predation, environmental variability, and interspecific competition are more contentious. The ranking for fishing is problematic because the ranking standards were unclear (i.e., which fisheries, by what measure of risk, before or after mitigation). High levels of uncertainty are associated with the remaining three threats and the rankings reflect how members interpreted these data differently.

One suggested approach involved reworking background sections to incorporate the full range of opinion, keeping the relative structure of the table for minor threats, and preparing several scenarios in which the controversial threats participate to varying degrees. There would be no single threat ranking, but the relative importance of these threats to each other would depend on the particular scenario. This form of scenario planning allows the introduction of unknown mechanisms and reduces the need to quantify impacts precisely. RT members recommended dropping the reference to PBR but keeping 200 animals as an arbitrary mortality standard. Several RT members reserved judgment on this approach until some written examples are available for review.

Additional Discussion of Future RT Direction

Capron noted that much more writing will be necessary to complete the RP, and speculated that most of this work will fall to the agency representatives and the PVA subgroup (Capron, Fritz, Small, and Pitcher). He suggested that the RT assemble the draft recovery plan based on information in hand and deliver it to NMFS by September 1 with a letter describing RT recommendations on remaining work. The subgroup will begin its work given that RT guidance and intent. RT members with interest or expertise in particular sections are asked to revise those sections and send them to the subgroup. The subgroup will assemble the document and send all or portions of it to selected peer reviewers with clear instructions on the type of review required. Based on reviewer comments, the subgroup will revise the RP and distribute it to the full RT for review. RT members who still desire substantive changes will be asked to submit alternative language to the team well in advance of a final meeting. At that final meeting the RT will discuss the draft and any proposed alterations, and members will have an opportunity to endorse the final draft or not.

Remaining RT members generally accepted the suggestion, as long as RT members can decide whether to endorse a draft document before any release to the public. Fraser volunteered to be involved with the PVA subgroup and Lloyd agreed to serve on a subcommittee to select and develop instructions for the peer reviewers. Members agreed that the RT might benefit from the input of outsiders and suggested that peer reviewers be given the opportunity to suggest alternatives in addition to critiquing the RT's approach. RT members discussed how much latitude the subgroup will have to rewrite the draft, since some noted that previous revisions had not always represented all sides fairly. Small stated that the subgroup will be guided by RT intent and will endeavor to include the views of all team members. He also noted that the ultimate test of the subgroup's success in this regard will be the peer reviewer comments and the final RT endorsement.

Additional Discussion of Biological Recovery Criteria

RT members revisited the Western DPS recovery criteria (p.5 [109]) for a final time before adjourning. Capron asked whether examples of types of vital rates to be used would be helpful for Criteria #2, but RT members sought assurance that failure to obtain information on a specifically mentioned vital rate would not later prove to be an obstacle to downlisting. They noted that future funding for SSL research is not likely to increase, and suggested using qualifying language like "available data" and "parameters such as…". Capron dismissed these

concerns, suggesting that NMFS will examine the criteria in its status review and determine their relevance under current conditions.

RT members also discussed whether stable or increasing trends should be required in a proportion of SSL sub-regions, and whether the Asian stock should be among those with the potential to decline. Some suggested that the RT distinguish between significant declines and those that are within the confidence intervals of the survey. Others noted that all sub-regions are not truly equal, and that the trends in sub-areas with large concentrations of animals are likely to drive the overall trend. RT members suggested that a recovery driven by the trend in a single area would be of concern, but one supported by trends in a majority of sub-regions (e.g., 5 of 7, including the Asian component) would likely maintain the genetic diversity of the Western DPS. Others cited the way in which recovery plans for other species have dealt with similar situations (e.g., Asian population of the Aleutian Cackling goose); criteria for Asian populations have not been included. The performance of Asian stocks has the potential to be the one factor the agency cannot control, and could prevent downlisting if recovery criteria are rigidly interpreted. Capron differed fundamentally with those who were willing to allow some possibility for the Asian population to decline. He suggested that the RP will provide direction to international negotiators, and that even suggesting the possibility of a declining Asian stock undermines any attempts to reduce incidental takes in Russia.

After thanking RT members for their efforts, Bernstein adjourned the meeting at approximately 11:10 on August 19.

Table 1. Attendance at all or portions of the Steller Sea Lion Recovery Team meeting held 15-19 November 2005 at the Islands and Ocean Center, Homer, Alaska.

*	Shannon Atkinson	Alaska Sea Life Center & University of Alaska, Fairbanks
~	Linda Behnken	Alaska Longline Fishermen's Association
‡	Brock Bernstein	
	Alicia Bishop	National Marine Fisheries Service
*	Vernon Byrd	U.S. Fish & Wildlife Service
	Shane Capron	National Marine Fisheries Service, OPR
†	Al Didier	
	John LePore	National Marine Fisheries Service
*	Denby Lloyd	Alaska Department of Fish and Game
*	Dave Fraser	F/V Muir Milach
*	Lowell Fritz	National Marine Fisheries Service
*	Tom Gelatt	National Marine Fisheries Service
	Dan Goodman	Montana State University
*	Dave Hanson	Pacific States Marine Fisheries Commission
*	Lianna Jack	Alaska Sea Otter and Steller Sea Lion Commission
*	Donna Parker	F/V Arctic Storm
	Erica Philips	National Marine Fisheries Service
*	Ken Pitcher	Alaska Department of Fish and Game
**	Bob Small	Alaska Department of Fish and Game
~	Alan Springer	University of Alaska, Fairbanks
*	Ken Stump	
	Clem Tillion	Aleutian Enterprise Corp.
*	Andrew Trites	University of British Columbia & North Pacific Universities Marine Mammal Research Consortium
*	Terrie Williams	University of California, Santa Cruz
	Bill Wilson	North Pacific Fishery Management Council
*	Kate Wynne	University of Alaska, Fairbanks

*	Steller Sea Lion Recovery Team Member
~	Steller Sea Lion Recovery Team Member, absent
**	Chair, Steller Sea Lion Recovery Team
†	Rapporteur
‡	Facilitator

Table 2.   Table of model correction factors developed by the SSLRT on August 16, 2005. Unless otherwise specified, correction factors in this table refer to the total number of animals taken during the period. Correction factors in the fishing scenarios are annual percentage mortality rates attributable to that factor.

	Periods				
	1958-77	1977-85	1985-89	1989-2000	2000-04
Model parameters:					
SSL Population size (1000s, start of period)	228	192	131	67	42
wSSL growth rate (%)	-0.906	-4.737	-16.843	-4.134	2.813
Correction Factors:					
Deliberate harvest	45,178	0	0	0	0
Subsistence	9,995	2,900	850	3,300	750
Shooting	12,716	8,277	1,870	2,200	1,000
Incidental mortality/fishing gear	28,191	14,461	2,255	330	150
Fishing Scenario A:					
Disturbance + prey competition/rookeries	0%	-2.50%	-2.50%	0.00%	0%
Prey competition without time/area closures	0%	-1%	-1%	-1.00%	0%
Fishing Scenario B:					
Disturbance + prey competition/rookeries	0%	-1%	-1%	0.00%	0%
Prey competition without time/area closures	0%	-2.50%	-2.50%	-2.50%	0%
Global TAC	constant	constant	constant	constant	constant

Steller Sea Lion Recovery Team Meeting
Draft Agenda
Homer, Alaska, 15-19 August 2005

Time	Activity

Monday
8:30 – 10:00 — Review meeting purpose and goals
- Welcome
- Introduce facilitator
- Present meeting goals and NMFS perspective
- Review Terms of Reference & Recovery Plan Structure and Content
- Discuss finalization process

10:00 – 12:00 — Review agenda and time budget
- Overview of revised document
- Present expected outcomes
- Identify major issues
- Recovery criteria quick overview
- Discuss and adjust agenda and time budget
- Ground rules and decision-making process

12:00 – 1:00 — Lunch

1:00 – 5:00 — Factors influencing the populations(1)
- Describe changes to draft
- Identify remaining issues
- Organize relevant information, perspectives
- Decide next steps

Evening — Factors influencing the populations (2)
- Revisions by writing subteams

Tuesday
8:30 – 10:30 — Factors influencing the populations (3)
- Present results of evening work
- Identify remaining issues
- Decide final approach

10:30 – 12:00 — Factors influencing the populations (4)
- Prepare final text and/or recommendations

12:00 – 1:00 — Lunch

1:00 – 5:00 — Threats assessment
- Describe changes to draft
- Identify remaining issues
- Organize relevant information, perspectives
- Prepare final text

Evening	• Threats assessment writing subteam if necessary
	• PVA subteam meets with Dan Goodman

Wednesday

8:30 – 12:00	Recovery criteria (1)
	• Link criteria to ESA requirements
	• Present and explain approach/strategy
	• Review new text
	• Present PVA conceptual approach and details
	• Identify and discuss key issues
	• Decide next steps
12:00 – 1:00	Lunch
1:00 – 5:00	Recovery criteria (2)
	• Discuss and resolve remaining issues

Thursday

8:30 – 9:30	Sub-population performance, eDPS
	• Describe southern range issues
	• Review ESA language and guidance
	• Present rationale for decision regarding southern sub-region
	• Identify any remaining issues
9:30 – 12:00	Recovery actions (1)
	• Review link between threats and recovery actions
	• Present categories of actions
	• Identify highest priority categories
12:00 – 1:00	Lunch
1:00 – 5:00	Recovery actions (2)
	• Complete prioritization
	• Identify needed revisions to text
	• Draft experimental option
	• Present and modify implementation schedule
Evening	Post delisting monitoring subgroup

Friday

8:30 – 10:30	Implementation and monitoring
10:30 – 11:00	Present post delisting monitoring approach
11:00 – 12:00	Research plan (1)
	• Present goals and approach
12:00 – 1:00	Lunch
1:00 – 4:00	Research plan (2)

- Develop research framework
- Map recovery actions onto framework

4:00 – 5:00   Identify remaining issues

5:00   Adjourn

Appendix A

This appendix contains RT comments on specific paragraphs in Subsection V.B.8 – Reduced Prey Biomass and Quality – draft of August 8, 2005. Throughout this summary, paragraphs are numbered starting from the first complete paragraph at the top of the page. Initial page numbers refer to the number printed at the bottom of the printed draft page, which begin at the start of Chapter V. Page numbers in brackets refer to the page number in the compiled draft RP electronic file.

¶ 3, p. 20 [57] – Interspecific competition is included as one of the three sources of reduced prey biomass and quality, but some RT members believed this is a manifestation rather than a source. They suggested that better examples of interspecific competition unrelated to regime shift be provided.

¶ 1, p. 21 [58] – This paragraph refers to an appendix that no longer exists; RT members suggested that reference be made to stock assessment documents, the NRC report, or the Bering Sea ecosystem report. Others suggested that figures from the NRC report might also be useful. Others objected to the figure citations, maintaining that the low starting values in each time series were merely an artifact of inadequate data.

¶ 2, p. 21 [58] – Some RT members objected to use of the term "junk food hypothesis" in the last two sentences as outdated. In its most recent form, the hypothesis postulates a nutritional problem for juvenile animals but not for adults. Others suggested that the section focuses too much attention on conditions after the 1972 regime shift and devotes no attention to current conditions. There was also extended discussion about how the results of the Alaska Sea Life Center nutrition studies compare to those reported by Trites. Trites was asked to draft substitute language.

¶ 3, p. 21 [58] – Some RT members criticized characterizations of fishing in this paragraph as too global. They noted that despite the large quantities involved, fishing removals rarely take more than 15% of the total biomass; this paragraph ignores the quantities of biomass that remain. They suggested the addition of references to exploitation rates, with comparisons to other fisheries around the world. They questioned the basis upon which fishing activities were characterized as "large scale" (e.g., biomass of catch, exploitation rates, numbers of vessels).

¶ 1, p. 22 [59] – Some RT members questioned how the discussion of MSY links to ecosystem effects; they suggested that the last sentence of this paragraph might be better at the beginning. Others questioned the purpose of the paragraph and its focus on spawning biomass, since the RT had been told that younger fish were more important prey for SSL; suggested solutions included a reference to Appendix 1 or a better explanation of the linkages between total biomass and spawning biomass.

¶ 2, p. 22 [59] – Some RT members suggested that discussion of specific studies be moved to Appendix 1 p. 29 [66].

¶ 3, p. 22 [59] – Some RT members dismissed the description of fishery impacts on fish size as speculation, suggesting that the impacts of fisheries on the available prey field could be either positive or negative for SSL. They argued that the description of the threats in this section should drive the threats assessment table; a predetermined threats table should not drive the

discussion. Others objected to including alternative perspectives, maintaining that there are opportunities for endless speculation in many areas. RT members generally agreed that the text of this section should address areas of uncertainty and that the data gaps section should be reserved for identifying information that must still be learned, but they were inconclusive on how to deal with speculation. The use of less definitive language (i.e., may, could) was suggested.

¶ 4, p. 22 [59] – Some RT members believed this paragraph provides little useful information due to its selective use of data (e.g., comparisons to catch rather than to total biomass). Others emphasized that most of the statistics cited are the results of modeling exercises and not direct observations. Some argued that the purpose of the paragraph is to contrast the relative impacts of SSL feeding, fisheries, and natural fluctuation on prey biomass, and that the focus should be on these concepts in general terms rather than on details. They suggested that the 2003 BiOp could be referenced as a recent attempt to reconcile these issues.

¶ 1, p. 23 [60] – Some RT members suggested that this paragraph effectively blames fisheries for the increase in arrowtooth flounder populations. While the increases in arrowtooth flounder and halibut populations are factual, the linkages between these increases and fisheries are speculative. They asked that this distinction be clarified. Byrd and Wynne were also asked to provide additional examples of diet overlaps between SSL and other non-fish piscivores (e.g., birds, other marine mammals). Trites was asked to provide additional information on regime shifts. RT members suggested that this section should also acknowledge inter-annual variation, heterogeneity, and geographic variation in fine scale structure impacts.

¶ 2, p. 23 [60] – RT members noted that the last sentence in this paragraph cites two notable exceptions but neglects to say what those exceptions are.

¶ 3, p. 23-24 [60-61] – Trites noted that Holmes and York (2003) suggested declining fecundity during the 1990s based only on data from Marmot Island. His work agreed with that assessment at that location, but found that trend at only 6 of 33 rookeries, suggesting that different factors could be at work at different sites. Since SSL life history can vary (i.e., females do not necessarily give birth every year), it is a simplification to say that fecundity dropped each year. RT members suggested that the paragraph acknowledge that the data come from a limited geographic area. Some RT members were unclear how this discussion of earlier studies related to current threats.

¶ 1, p. 24 [61] – Some RT members suggested that this paragraph introduces new information that is more appropriate for the appendix. Others suggested that it should acknowledge the difficulty of detecting nutritional stress under field conditions even when it does exist.

Appendix B

This appendix contains RT comments on specific paragraphs in Subsection V.C.1.2.1.2 – Listing Factor Criteria (Threatened) – draft of August 8, 2005. Initial page numbers refer to the number printed at the bottom of the printed draft page, which begin at the start of Chapter V. Page numbers in brackets refer to the page number in the compiled draft RP electronic file.

p. 5-6 [109-110] – The preface to the Listing Factor section refers to "downlisting" the species to Threatened status, but all of the sections describing specific factors reference assurance that "delisting" is warranted.

p.6 [110] – RT members questioned whether Factor A.1 – "Knowledge of the foraging ecology of Steller sea lions is sufficient to conclude …. will not limit sea lion recovery." – is too absolute. Some suggested changing "foraging ecology" to "nutritional status", since the former is to generic and there are parameters associated with the latter that could be assessed. They maintained it is unlikely that researchers will ever know the foraging ecology for the entire range of SSL. Others suggested that if the intent is to determine whether there is adequate prey, then foraging ecology studies are the most important work the agency can do.

p.6 [110] – RT members questioned the meaning of the phase "recovery of sea lions is not limited" in Factor A.2. They suggested a reference to PBR, or possibly including the phase "more than anticipated in this plan".

p.6 [110] – Some suggested that the first sentence in Factor A.2 is sufficient, and recommended dropping the second sentence referring to a Section 10 review of state fisheries. They agreed with the general intent as stated in the first sentence that state fisheries not limit the recovery of SSL, but objected to specifying a particular mechanism.

p.6 [110] – Some suggested removing the reference to "non-U.S. management measures" in Factor A.2 believing that the reference to international agreements and cooperative recovery programs in Factor D.4 (p.7[111]) is sufficient.

p.6 [110] – Factors A.3 and D.3 appear to be redundant.

p.6 [110] – Factor B.1 referencing co-management agreements should be moved to Factor E (p. 7 [111]) to be consistent with other listing factors.

p. 6 [110] – Some questioned why Factor B.2 suggests incidental takes should not "increase the time to recovery" when all other factors refer to not limiting recovery. They feared that the functional interpretation of this language could be that no incidental takes are allowed. They suggested that takes "not exceed PBR", but Capron preferred to avoid references to particular benchmarks or standards like PBR. The language "not limiting recovery" was rejected as too broad, and reference to "significantly limit" was rejected because of its statistical implications. The language "appreciably limit" was suggested as a compromise.

p. 6 [110] – Some questioned whether Factor B.4 should be dropped, but others expressed interest in the use of non-harmful deterrents. Generally, if recovery occurs and the likelihood of interactions increases, RT members would like to see non-harmful deterrents developed.

p. 6 [110] - Factors B.5 and E.5 appear to be redundant. Some suggested making E.5 more specific and deleting B.5

p. 7 [111] - Some questioned whether the requirement to "review all pertinent information" in Factor D.3 could be unreasonable. They suggested instead a generic list of the documents to be reviewed. Capron noted that the agency already has an obligation to use the best available information.